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ABSTRACT

Seventy citations (1886-1980) on psychological and environmental treatment of asthma are reviewed. Information is analyzed for the following topics (sample subtopics in parentheses): assessment of asthma (self report, activity restriction, medical examination); behavior therapy (relaxation procedures, biofeedback, operant techniques); dynamic psychotherapy; hypnotherapy; and environmental alteration (physical and sociological environments). It is concluded that psychological strategies provide a useful adjunct to traditional medical approaches; that conditioned behavior problems resulting from lowered social expectations frequently assigned to asthmatics can be successfully modified; and that a self directed orientation to coping with the emotional stress of asthma symptoms can be achieved. (CL)

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Psychological and Environmental Treatment of Asthma: A Review

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Introduction

Asthma may be defined as an intermittent, variable, and reversible airway obstruction (Chai, 1975). A multiplicity of stimuli may trigger asthmatic attacks. Persons suffering attacks in reaction to specific allergens, such as pollens, dander, or dust, are said to experience extrinsic or allergic asthma. Here, the triggering stimuli for attacks may be identified. Children and young adults are usually affected by this form of asthma. Attacks tend to be of sudden onset and brief duration. During the interim between attacks, however, the patient may be symptom-free. Individuals with this type of asthma may have both a personal and a family history of other allergic manifestations such as hay fever or eczema (atopy) (Weiss, 1975).

When the etiology of a patient's asthma cannot be specified, the patient is said to experience intrinsic asthma. Infection is involved in many of these cases.

Mixed asthma refers to both extrinsic and intrinsic factors in apparent combination. Here, allergic components are significant, but acute episodes of asthma are frequently initiated by infections of the respiratory tree (Creer, 1979).

Learning factors associated with asthma are widely documented (Dekker & Groen, 1956; Dekker, Pelser, & Groen, 1957; Turnbull,

1962). Learning approaches generally emphasize one of two analyses: (1) classical conditioning, and (2) operant conditioning.

Classical Conditioning

Antecedent stimuli through classical conditioning have been known to elicit asthmatic attacks. As an example, Chong (1977) reports that during wartime an army colonel developed his first attack of asthma in Malta amid the extremely dusty conditions during repeated bombing attacks. Years later while standing on a ship's deck, he experienced an attack of asthma upon hearing one of the passengers exclaim, "Oh, look, there's Malta."

Asthmatic symptoms (wheezing, chest constriction, coughing, labored breathing) often serve to precipitate panic, fear, and anxiety for the patient. These symptoms become aversive stimuli. These stimuli, when onset is perceived by the patient, serve as aversive cues for him (conditioned stimuli for further anxiety), so that even before a bonafide attack begins, the patient experiences anxiety and a sense of panic. The anxiety and panic only serve to further exacerbate the onset of symptoms. This process, then, may be described as the "vicious cycle" of asthma.

In some patients, the mere affording of a suggestion which is related to an asthma eliciting stimulus serves as an aversive cue, or conditioned stimulus. For example, Mackenzie (1886) describes a female patient known to be allergic to roses.

Exposure to an artificial rose which she believed to be a natural rose promptly precipitated an acute asthma attack.

Operant Conditioning

Creer (1979) reports that reinforcing stimuli can serve in an operant fashion to maintain or exacerbate asthma attacks. The example is given of the young asthmatic boy who has discovered that his "post-bedtime" attacks are reinforced by his mother's unfailing attention on such occasions.

Assessment of Asthma

For scientific investigation to be valid, there must be objective, reliable dependent measures. With regard to asthma, at least six general types of assessment data can be gathered: (1) patient self-report, (2) clinical examination, (3) medication consumption, (4) restriction of activity, (5) hospital admissions, and (6) pulmonary function. It is noteworthy that only the latter dependent measure requires a sophisticated mechanical apparatus of sorts. The other five assessment procedures do not necessitate such technology and can therefore be employed through direct behavioral observation.

Patient self-report can be charted in any or all of at least three categories: (1) number of attacks, (2) duration of attacks, and (3) severity of attacks. Data sheets with specific columns for each of these measures can be afforded to the patient by the clinician. The patient can then on an hourly or daily basis record the number of attacks he suffers, the duration of the specific attack (in minutes), and assign a one to five point rating, for example, to the attack.

Clinical examinations by competent physicians might also afford the necessary data for a second dependent measure of asthma. Based on the patient's subjective self-report of his symptoms, and on the severity of observed wheezing and coughing, the physician is able to assess the relative condition of the asthmatic individual. Independent, unbiased investigators

can then review the physicians' recorded progress notes of his patients, assigning a numerical rating of perceived asthma severity for each office visit.

Recording the medication requirements of the patient may entail the use of three basic parameters: (1) type of medication, (2) frequency consumed, and (3) dosage taken. A veritable plethora of various medications exist for the asthmatic individual, ranging from the often initially employed theophylline to the usage of the very potent corticosteroids. The relative strength of the medication utilized by the patient is therefore assessed and as such can be afforded a numerical rating in its own right. The frequency with which this particular medication is used, along with the specific dosage, may also be given numerical ratings which could then perhaps be averaged or weighted with the numerical rating of the medication potency in order to derive a single numerical medication rating.

Activity restriction can be defined as the amount of time a patient loses from his normal routine as a result of asthma (Creer, 1979). This measure is usually calculated as the number of days the person is absent from work, school, or leisure activities. In addition to the patient's self-report concerning such indices, corroboration can also be provided by reports of family members, work records, and school attendance.

Hospital admission data can be gathered from the patient and from access to his medical records through his physician. Basically, the frequency and duration of hospitalizations will

serve to provide another assessment measure with regard to the asthma sufferer.

Direct measurement of the patient's pulmonary function is a physiologically gauged assessment measure, unlike the other dependent variables already mentioned. Generally speaking, there are five principal means of rating pulmonary function: (1) forced vital capacity (FVC), the maximum amount of air that can be expelled following a maximal inspiration; (2) forced expiratory volume (FEV), the amount of air expelled in the initial full second after the onset of expiration; (3) maximum mid-expiratory flow rate (MMFR), the average rate of airflow during the middle half of the forced expiration; (4) peak expiratory flow rate (PEFR), rate of air out-flow at the peak of the expiration curve; and (5) total respiratory resistance (TRR), a small, precisely calibrated amplitude pressure variation which is pumped continuously into the patient's airways, resulting in a measure of respiratory resistance. FVC, FEV, and MMFR are all gauged by a spirometer, while PEFR is assessed through the use of a peak flow meter. TRR is measured by a sophisticated mechanical device expressly designed to gauge respiratory resistance. Only the TRR is non-effort dependent, thus making it the most reliable of all the pulmonary function measures herein mentioned.

Literature Review: Psychological and Environmental Treatment of Asthma

Behavior Therapy

Relaxation procedures. The most frequently employed technique for the behavioral treatment of asthma has been some form of relaxation training intended to lessen anxiety levels, or reduce sensitivity (systematic desensitization) to stimuli which appear to elicit asthma (Knapp & Wells, 1978). The literature presents three treatment paradigms employing relaxation: (1) progressive muscle relaxation (Alexander, 1972; Alexander, Gerd, Cropp, & Chai, 1979; Alexander, Miklich, & Hershkoff, 1972; Philipp, Wilde, & Day, 1972; Tal & Miklich, 1976), (2) systematic desensitization (Cooper, 1964; Miklich, Renne, Creer, Alexander, Chai, Davis, Hoffman, & Danker-Brown, 1977; Moore, 1965; Sergeant & Yorkston, 1969; Walton, 1960; Yorkston, McHugh, Brady, Serber, & Sergeant, 1974), and (3) electromyegraph (EMG) biofeedback assisted relaxation (Davis, Saunders, Creer, & Chai, 1973; Payette, 1977; Kotses, Glaus, Bricel, Edwards, & Crawford, 1978; Kotses, Glaus, Crawford, Edwards, & Scherr, 1976; Scherr & Crawford, 1978; Scherr, Crawford, Sergeant, & Scherr, 1975).

Alexander et al. (1972) provided the first experimental evidence concerning the previously assumed belief that relaxation aids in the amelioration of asthma symptoms. They found that 20 minutes of modified progressive relaxation training

brought about a statistically significant, eleven per cent improvement in PEFR immediately following relaxation in a group of severe, chronic asthmatic children, contrasted against no change in a matched group of children who were instructed to merely sit quietly for an identical period of time. These results were replicated by Alexander (1972) in another controlled study with a comparable sample of severely asthmatic children. A ten per cent PEFR improvement was found. Philipp et al. (1972) similarly found that seven out of ten subjects afforded ten minutes in which to relax following previous relaxation training improved in FEV compared to controls ($p < .05$), with the largest change reported as 20 per cent. In addition, when the pre-post FEV training values were compared, the difference was also statistically significant ($p < .01$). The three largest changes were 14, 11, and seven per cent. Similar results in children samples have also been cited by Tal and Miklich (1976) who employed FEV.

The most recent study, by Alexander et al. (1979), employed a three phase experimental paradigm with a group of 14 chronic asthmatic children who received treatment as follows: (1) phase one in which there consisted three sessions of quiet rest, (2) phase two in which all subjects received five 30 minute sessions of relaxation training (Jacobsen, 1938; Luthe, 1969), and (3) three sessions of undirected relaxation as per the subjects' prior training. Pulmonary functioning (FVC), EMG, and heart rate (HR) were assessed at pre- and post-session

junctures. The results concluded that although EMG and HR did decrease following relaxation training, there was no clinically significant change in FVC noted.

Relaxation instructions have typically employed those procedures set forth by Jacobsen (1938) or Schultz and Luthe (1959). The number of sessions in these studies range from three to six, with the length per session totaling 30 minutes, plus instructions for twice daily home practice.

Relaxation training has rather consistently produced statistically significant improvement in subjects' pulmonary function measures (PEFR, FEV, FVC) when compared to those subjects receiving no treatment (Alexander, 1972; Alexander et al., 1972; Alexander et al., 1979; Philipp et al., 1972). These results, though highly promising, presented several problems. First, the amount of change, averaging no more than a ten per cent increase in flow rate across studies, was of modest proportion. For clinical as opposed to simple statistical significance to be claimed, increases in flow rate would have had to be substantially greater than ten per cent. The improvements found in the relaxation studies to date would not even be subjectively detectable by patients, nor do they approach the extent of lung function or subjective benefit obtainable from the most commonly employed pharmacological alternatives for symptomatic relief.

Second, the high effort dependent forced expiratory flow rate measures that were employed tend to taint the relative

significance that may be realistically placed on the findings of these studies. Furthermore, these measures are somewhat invalidated in that they reflect predominately large airway dynamics. Asthma is a disorder of variable, intermittent, and reversible airway obstruction in which lung pathology occurs both in the larger airways as well as in the peripheral, smaller airways including the alveoli (McFadden & Ingram, 1976). Therefore, before any obtained effects of relaxation on pulmonary function could be plausibly accepted, more definitive and complete measurement of pulmonary physiology would have to be utilized, involving measures of both large and small airways, not to mention measures that are much less effort dependent.

Third, with the exception of the most recent study (Alexander et al., 1979), the obtained effects of relaxation training on lung functioning had been assessed immediately following relaxation only. Indeed, in order for a symptomatic treatment modality to be considered clinically efficacious, a beneficial influence capable of sustaining its effect for a prolonged period subsequent to the actual relaxation training would need to be demonstrated.

Several studies have reported improvement in asthma patients as a result of systematic desensitization designed to both promote relaxation and reduce anxiety (Cooper, 1964; Miklich et al., 1977; Moore, 1965; Sergeant & Yorkston, 1969; Walton, 1960; Yorkston et al., 1974). The various items in

desensitization hierarchies have concerned asthmatic attacks per se ("fighting for breath"), stimuli which evoke attacks ("a very hot day in a closed room"), and idiosyncratic psychologically stressful events, e.g., "husband is thirty minutes late coming home from work" (Sergeant & Yorkston, 1969). The number of sessions in such studies have ranged from six to ten; the duration of sessions vary from 30 to 60 minutes.

When comparisons have been made between progressive relaxation training alone versus systematic desensitization, the latter method has invariably proved superior (Moore, 1965; Yorkston et al., 1974). Moreover, all studies reviewed cite substantial reductions in asthma symptoms (Cooper, 1964; Miklich et al., 1977; Moore, 1965; Sergeant & Yorkston, 1969; Walton, 1960; Yorkston et al., 1974). The consensus among these studies primarily is that relaxation training when employed as a component of various modes of deconditioning strategies can be of clinically significant value in the reduction of anxiety and for responses to asthma itself. In so doing, symptomatology is reduced. However, a point to be emphasized is that such a treatment modality alters anxiety levels, not pulmonary function necessarily.

A number of studies have employed EMG biofeedback assisted relaxation training to treat asthma symptoms. Dependent variables have generally been various pulmonary functions (PEFR, FEV, or FVC) (Davis et al., 1973; Payette, 1977; Kotses et al., 1976; Kotses et al., 1978; Scherr et al., 1975; Scherr & Crawford, 1978).

The paradigms of the six reported EMG biofeedback assisted relaxation training studies are as follows:

(1) The comparison of EMG frontalis biofeedback assisted relaxation training, versus Jacobsonian relaxation training, versus a no treatment control group (Davis et al., 1973),

(2) The combination of EMG frontalis biofeedback assisted relaxation training with Jacobsonian relaxation training versus a no treatment control group (Scherr et al., 1975),

(3) EMG frontalis biofeedback assisted relaxation training (pre- and post-treatment comparisons) (Payette, 1977),

(4) The comparison of EMG frontalis biofeedback assisted relaxation training, versus non-contingent EMG frontalis biofeedback, versus a no treatment control group (Kotses et al., 1976; Scherr & Crawford, 1978), and

(5) The comparison of EMG frontalis biofeedback assisted relaxation training, versus EMG brachio-radialis biofeedback assisted relaxation training, versus a no treatment control group (Kotses et al, 1978; Scherr & Crawford, 1978).

The outcomes of these studies have all yielded favorable results with regard to improved pulmonary functioning save for one (Payette, 1977). Although some studies reported statistically significant increases in lung functioning (Davis et al., 1973; Scherr et al., 1975), these did not appear to be clinically significant. Additionally, however, Scherr et al. (1975) did report a statistically significant decrease in the number of asthmatic attacks for the treatment group.

Operant techniques. There have been several experimental accounts employing direct pulmonary function biofeedback training (FEV, PEFR, MMFR, TRR) whereby subjects were provided with light-on feedback during trials in which the particular respiratory measure equalled or exceeded a given criterion (Danker, Miklich, Pratt, & Creer, 1975; Kahn, Staerk, & Bonk, 1974; Vachon & Rich, 1976). Another study utilized a meter read-out of FEV (Khan, 1977).

Feldman (1976) presented four children with severe asthma an analogue feedback tone which varied as a logorithmic function of TRR. Through an earphone apparatus the subjects heard the simulated sounds of an even rate of breathing after which they matched their breathing in synchrony. Dependent variables consisted of TRR, PEFR, and MMFR. Three experimental phases were employed in this subjects-as-own-control design: (1) TRR biofeedback, (2) Isoproteronol treatment, and (3) a one-half hour per session resting phase. Number of sessions in each phase was not specified. The results indicated that following biofeedback training, all four subjects showed improvement in all three pulmonary measures. These were equal to the benefits achieved through isoproteronol treatment. The one-half hour per session resting phase produced no significant changes in the dependent measures.

Abdullah (1974) reports in a purely anecdotal descriptive summary that some degree of improved respiratory functioning in

asthmatics has occurred as a result of a simple, yet ingenious biofeedback apparatus. The chest piece of a stethoscope is taped to the patient's chest directly over the bronchi. The patient then listens via the stethoscope to his own breathing sounds as he is being taught a simple breathing exercise combined with a meditation-relaxation procedure.

In general, the outcomes of the various operant studies is mixed. However, several have been successful in shaping respiratory functions (Feldman, 1976; Kahn et al., 1974; Vachon & Rich, 1976; Visser, 1976). Even so, for the studies which have shown effected conditioning, the degree of improvement, clinically speaking, has been rather slight.

Miscellaneous behavioral techniques. A few studies have employed techniques other than relaxation or operant conditioning (Hock, Bramble & Kennard, 1977; Rathus, 1973; Sirota & Mahoney, 1974).

Hock et al. (1977) sought to counter condition anxiety through relaxation training and assertive training. Three groups were employed: (1) progressive relaxation, (2) assertive training, and (3) a no treatment control. The assertive training (role playing and behavioral rehearsals) consisted of eight exercises of 40 minutes each. The results indicated that the relaxation training group significantly increased their FEV; however, there was a slight decrease in FEV among the group afforded assertive training. The authors concluded that perhaps assertive training may be contra-indicated for asthmatics due

to (1) an increased vigor which may serve to produce sympathetic activity inducing bronchiole constriction, or (2) mood changes inducing behavioral alterations on the part of the clients which may precipitate family tensions.

Rathus (1973) employed cognitive restructuring plus relaxation training to treat a case of hysterical bronchial asthma. Here, cognitive restructuring consisted of urging the patient to "name her attacks," respond to them with welcome rather than dread, and thereby demonstrating to herself the ability to deal effectively with them.

Another study by Sirota and Mahoney (1974) employed an innovation of sorts to traditional relaxation training. A portable timer was used on which the patient would set the device to sound at varying time intervals. In this manner, the timer would sound at the end of a particular interval and the patient would then relax on cue. Secondly, the authors required the patient to briefly postpone the use of a bronchodilater when he felt the onset of asthma symptoms. As soon as the onset of a symptom was perceived by the patient, he would set the timer for three to four minutes, during which time relaxation was practiced. When the timer sounded, the bronchodilater would be used only if needed. Both this study plus that of Rathus (1973) reported very positive results. It would appear that such miscellaneous behavioral techniques hold considerable promise for the symptomatic treatment of asthma.

Adjunct behavior problems. Several operant techniques (time-out, response-cost, shaping, modeling, etc.) have been utilized to treat a variety of behaviors associated with asthmatic children, such as hyperactivity (Gardner, 1968; Miklich, 1973), inappropriate behavior (Creer & Miklich, 1970), and frequency and duration of hospitalization (Creer, 1970).

Creer (1970) treated a ten year old asthmatic male with oversleeping, tantrum behavior, and inappropriate social behavior. In an ABAB design, the boy was afforded self-modeling through the viewing of a videotape featuring the patient himself acting out the opposite behaviors to those in which there were complaints. The author found that the boy's behavior did in fact correspond to that of the videotape during the two experimental periods of the study. Moreover, the patient's behavior was maintained at a six month follow-up.

Creer and Miklich (1970) treated two ten year old asthmatic males who had a history of frequent and extended hospital admissions. The authors hypothesized that the boys' symptoms were being reinforced by hospital stay. Therefore, the two patients were placed on a regime tantamount to a time-out procedure in which their reinforcers (television, magazines, toys, visitors) were greatly restricted. Within a six month time period, both frequency and duration of hospital admissions were significantly reduced ($p < .05$).

Hence, the outcomes of such studies as reported above wherein adjuct behavior problems to asthma are modified have been quite promising.

Dynamic Psychotherapy

By far, most case studies of dynamic psychotherapy in the treatment of asthma are psychoanalytically oriented (Jackson, 1976). Currently, opinions range from those who believe that dynamic psychotherapy is the most important approach to stress-induced asthma to those who regard this approach as completely inapplicable, except perhaps in the sense of a general supportive measure.

Three types of psychotherapy have been utilized in asthma treatment:

(1) individual psychotherapy (Bentley & Wilmerding, 1978; Jackson, 1976; Leigh, 1953; Lofgren, 1961),

(2) group psychotherapy (Forth & Jackson, 1976; Groen & Pelser, 1960; Jackson, 1976; Reckless, 1972; Sclare & Crockett, 1957), and

(3) family therapy (Gauthier, Fortin, Drapeau, Breton, Gosselin, Quintal, Weisnagel, Tetreault, & Pinard, 1977; Kaminski, 1975; Liebman, Minuchin, & Baker, 1974).

Within all three types of dynamic psychotherapy, the induction of catharsis seems to be the specific technique which is most frequently employed in the treatment of asthma (Jackson, 1976; Kaminski, 1975). In addition, the working through of symbiotic mother-child relationships has also received considerable attention in such studies (Gauthier et al., 1977; Kaminski, 1975), as have the re-structuring of maladaptive patterns of family interaction (Liebman et al., 1974).

Hypnotherapy

A host of studies have shown hypnosis to be effective in the treatment of asthma (Aronoff, Aronoff, & Peck, 1975; Chong, 1966; Collison, 1968; Gilder, 1968; Hanley, 1974: Maher-Loughnan, 1970; Maher-Loughnan, Macdonald, Mason, & Fry, 1962; Moorefield, 1971; Rose, 1967; Smith & Burns, 1960; Smith, Colebatch, & Clarke, 1970).

One rationale offered with regard to the benefits of hypnotherapy for asthmatic symptoms is that by altering the patient's emotional state, physiological changes such as relaxation of the bronchial musculature and altered mucous secretion are effected. These two results should then reduce symptomatology (Hanley, 1974).

A second point of reasoning asserted for the efficacy of hypnotherapeutic treatment of asthma, especially for adults, is the mediation of secondary psychological effects on symptoms. As stated earlier, the disorder is often complicated by fear and anxiety reactions to the asthmatic condition itself. Similarly, a defeatist attitude due to the effect of the disease on the patient's life, or the incorporation of the illness into previously existing maladaptive patterns is demonstrated. Hypnotherapy, then, has been shown to be of value in modifying these secondary effects of asthma, effects which exacerbate the pulmonary dysfunction (Collison, 1968; Gilder, 1968; Smith & Burns, 1960).

Environmental Alteration

Physical environment. In addition to the benefits provided by the other psychological treatment modalities already discussed, there are other procedures that are of therapeutic value to the asthma patient which entail an alteration in his environment. One such approach is the mere change in the individual's external physical environment. For example, a case of asthma precipitated by dust might behoove the patient living adjacent to a dusty country road to move to a locale devoid of much dust. However, Creer (1979) warns against the sudden uprooting of one's present locale in order to move to a new climate thought to be less suited to asthma exacerbation. The notion in years past that an asthma patient must move to another part of the country to obtain asthmatic relief is simply not an effective alternative in most cases, according to him. The wisest course of action for anyone who is contemplating a move to another geographical locale as a result of his asthmatic condition is to spend an extended stay in the new region before making a permanent move. This, according to Creer (1979), will enable the patient to become exposed to the various allergens particular to the new area which may affect his condition. In addition, an interview with a local allergist may also afford the patient information concerning the characteristics of the new environment which may also affect his asthma.

Short of moving himself to a new home in a distant geographical region, the asthmatic individual can take less extreme

measures to alter his immediate physical environment by way of simply seeking to avoid any particulate matter (fog, dust, mist, dander, pollen, smoke, soot) and airborn chemical insults (sulfur) dioxide, hydrocarbons, nitrogen oxide) which may be precipitating asthmatic symptoms. For example, asthma exacerbated by cat hair might be significantly improved by selling the family cat (Chong, 1977). Similarly, the avoidance of heavy downtown traffic and its thick concentration of hydrocarbons and nitrogen oxide may be extremely beneficial to an asthmatic patient who is sensitive to such irritants. This ecological approach to asthma prevention can be extended to the avoidance of various foods and the chemicals, additives and contaminants found in various foods, water, biological drugs, and synthetic chemical drugs which have all been found to precipitate asthma in various highly sensitive patients (Dickey, 1976; Klotz, 1976; Randolph, 1976).

Sociological environment. A second form of environmental manipulation is a change in the asthma patient's interpersonal environment. The role of maladaptive family interaction patterns as being contributory to asthma has already been discussed (Liebman et al., 1974). In such a situation, an asthmatic college student living tempestuously with his parents in their home might consider getting a place of his own in which to live. Similarly, "parentectomies" have proved effective in some cases. Here, the enrollment of an asthmatic child in an asthma inpatient treatment facility, thus removing his parents from him, has on occasion brought about a dramatic improvement in his condition (Jackson, 1976).

Miscellaneous

Another therapeutic procedure when applied to some asthmatic attacks is the remedy of having the patient sit down and sip a large glassful of warm (not hot) water (Grant, 1979). The first glass should be consumed over a period of about 15 minutes. He should then promptly begin sipping another large glassful of warm water over another 15 minute period. In this way, the asthmatic individual consumes approximately a pint of warm water over a half an hour. This water intake should be employed when the person first begins to show symptoms of an impending asthma attack, such as coughing, wheezing, labored breathing, and chest constriction. In a great many cases, this procedure inhibits asthma attacks before they fully develop.

The rationale for this approach is based on the notion that dehydration is often the precipitating cause of asthma attacks, due to the fact that the mucus in the lungs becomes less fluid and therefore more difficult to cough up. This unexpelled mucus then serves to precipitate excessive coughing, anxiety, and spasm of the bronchioles, which all appear to then induce an attack. Even when infection precipitates an attack, as is not uncommon, dehydration (from fever and sweating) is an important contributing factor which must be rectified before the patient can recover.

Summary and Conclusions

Psychological and environmental approaches to asthma treatment would seem to offer promise, as indicated by the studies cited in the present literature review. However, although in some areas of study the potential for therapeutic applicability has been established, there still remains the question of whether or not a significant clinical utility with long-term maintenance can be established with regard to, principally, the various relaxation techniques as well as the operant approaches to asthma treatment.

According to Alexander et al. (1979), the hypothesis that relaxation ameliorates asthmatic symptoms may have been rather naive. Relaxation is generally conceptualized physiologically to entail at least a decrease in sympathetic and adrenergic activity, if not a shift toward the parasympathetic direction. They point out that both conditions are distinctly detrimental to asthmatics inasmuch as adrenergic agonists constitute the basis of therapeutics in asthma, usually resulting in an immediate and profound bronchodilation. Cholinergics, on the other hand, result in equally profound and rapid bronchoconstriction. Physiological relaxation, then, might be in reality a counter-indication in asthma treatment. The fact that "relaxation" of some nature is so often perceived as beneficial to asthma sufferers simply attests to the heretofore

incompletely understood complexities of both asthma and relaxation (Alexander et al., 1979).

The most optimistic appraisal of the benefit of relaxation as a palliative therapy in asthma is that its effect does appear to minimally improve lung function (Alexander, 1972; Alexander et al., 1972; Philipp et al., 1972; Tal & Miklich, 1976). However, these reported improvements in pulmonary function have been found to be of little or no clinical significance. Furthermore, there is the possibility that the minimal effects on pulmonary function that have been reported are due to subtle alterations of patient motivation and effort during measurement, rather than as a result of relaxation training.

The potential long-term benefits of regularly practiced relaxation are also shrouded in pessimism. There has been a failure to find any long-term positive effects of relaxation training in asthmatic children (Alexander et al., 1979; Davis et al., 1973). Similarly discouraging data have been reported concerning the clinical effectiveness of systematic desensitization which includes regularly practiced relaxation in affecting significant alteration of pulmonary function in asthmatic children (Miklich et al., 1977). Nevertheless, it has been demonstrated that relaxation training when employed as an adjunct to various modes of deconditioning therapeutic procedures can be of clinically significant value in the reduction of fear responses to asthma itself (Cooper, 1964; Moore, 1965; Sergeant & Yorkston, 1969; Walton, 1960; Yorkston et al., 1974). However,

as stated earlier, it may be the excessive anxiety levels which are altered by the deconditioning therapy, not lung function. Once the maladaptive anxiety is decreased, the asthmatic individual usually finds that his asthma is thereby reduced. The literature is clear that systematic desensitization appears to be superior to relaxation training in studies which have compared the two approaches.

Operant procedures wherein direct pulmonary function biofeedback is employed has generally reported limited results as well as very slight actual clinical improvement (Feldman, 1976; Kahn et al., 1974; Vachon & Rich, 1976; Visser, 1976) similar to the overall effects reported by the various relaxation techniques. However, the anecdotal account presented by Abdullah (1974) wherein a simple stethoscope is employed to afford biofeedback of breathing sounds to the asthmatic patient is a simple and ingenious procedure which perhaps behooves a controlled study relative to its possible merits.

The miscellaneous behavioral study reported by Sirota and Mahoney (1974) in which a kitchen timer was utilized to allay or avoid the use of a bronchodilater is another simple, yet highly resourceful therapeutic technique. In this way, the timer was set for varying time intervals and upon hearing the timer's sounding at the end of the interval, the patient would then begin to relax on cue, thereby helping to ensure the generalization of the relaxation response in the individual's home environment.

Possibly the most promising area employing psychological approaches to asthma treatment is in the realm of modifying various adjunct behavior problems to asthma itself. Positive results have been reported in dealing with hyperactivity (Gardner, 1968; Miklich, 1973), inappropriate behavior (Creer & Miklich, 1970) and the frequency and duration of hospitalization (Creer, 1970). By adaptively modifying such adjunct behavior problems affecting asthma, the symptomatology can often be ameliorated.

With regard to the contributions of dynamic psychotherapy to asthma treatment, several studies have reported success through: (1) inducing catharsis (Jackson, 1976; Kaminski, 1975), (2) the working through of symbiotic mother-child relationships (Gauthier et al., 1977), and (3) restructuring maladaptive family interaction patterns (Liebman et al., 1974).

Hypnotherapy applied to asthma treatment has largely sought to modify the secondary effects of asthma such as fear and anxiety reactions which then serve to further exacerbate symptomatology (Collison, 1968; Gilder, 1968; Smith & Burns, 1960).

In addition, various types of environmental alteration were reviewed including (1) sociological manipulation, involving the notion of "parentectomies" for asthmatic children (Jackson, 1976) and (2) ecological change, focusing on food, chemical, and airborn insults which may precipitate asthmatic symptoms in certain allergic individuals (Randolph, 1976).

Lastly, water therapy has been cited as having benefit for the asthma patient who is affected by his own varying degrees of dehydration, a condition which thickens mucous contents, thereby rendering this material more difficult to expel from the airways, thus aggravating the asthma symptoms (Grant, 1979).

For the clinician utilizing psychological and environmental methods in the treatment of asthma, the literature suggests that such procedures can indeed be therapeutically beneficial when performed in alliance with the traditional medical approach. The behaviorally oriented clinician will of course employ one or more of the various dependent measures of asthma such as patient verbal report, clinical examination data, medication requirements, restriction of activity, hospital admissions, and pulmonary function to serve as baseline and clinical progress data.

In conclusion, the literature demonstrates that psychological strategies to asthma treatment provide a useful adjunct to the traditional medical approach to this complex disorder. Another conclusion is that conditioned behavior problems resulting from the lowered social expectations usually assigned to asthmatics (e.g., dependency and irresponsible behavior) can be successfully modified. Lastly, a self-directed orientation enabling more effective coping with the emotional stress generated by asthma symptoms can be achieved.

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